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Simpson Lake Rainbow Trout Transplant, 1994

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The Peace/Williston Fish & Wildlife Compensation Program is a cooperative venture of BC Hydro and the provincial fish and wildlife management agencies, supported by funding from BC Hydro. The Program was established to enhance and protect fish and wildlife resources affected by the construction of the W.A.C. Bennett and Peace Canyon dams on the Peace River, and the subsequent creation of the Williston and Dinosaur Reservoirs.

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ABSTRACT

A fish transplant was undertaken in 1994 with the intent of creating a self sustaining population. Rainbow trout *(Oncorhynchus mykiss),* a Williston Reservoir "east slope" wild stock, were taken from the W.A.C. Bennett Dam intake towers and transplanted to Simpson Lake. Simpson Lake is located in north central B.C. and drains into the Pine River. The results of a reconnaissance survey in 1991 (McLean and Langston), indicate that Simpson Lake was barren of all fish species but could potentially support a fish population. An "east slope" wild stock donor source was desirable for Simpson Lake as opposed to a southern hatchery stock which may impact the genetic make-up of the native "east slope" stocks of the Pine River. Fish were captured with the use of a modified gillnet and angling gear. Twenty-six rainbow trout were caught and transplanted to Simpson Lake. Other fish species captured were removed from the intake towers and released. Captured kokanee *(Oncorhynchus nerka)* (45) and one lake trout *(Salvelinus namaycush)* were transplanted to Dunlevy Creek. Lake whitefish *(Coregonus clupeaformis)* (172 +) and an additional 15 kokanee were released back into Williston Reservoir outside of the intake towers. Another transplant is required in 1995 to establish a rainbow trout population in Simpson Lake.

INTRODUCTION

The results of a reconnaissance survey in 1991 (McLean and Langston), indicate that Simpson Lake was barren of all fish species but could potentially support a fish population. Simpson Lake, approximately 65 km west of Chetwynd, is located in an area with relatively few small lake fisheries. Anglers from the nearest community of Chetwynd are likely to concentrate their angling effort on the rivers in the area. Creating a new lake fishery in the area would diversify angling opportunities and relieve pressure on other wild fish stocks.

The outlet of Simpson Lake consists of a series of chutes and falls and flows southeast into the Pine River. The falls are a barrier to upstream fish migration but may not be a barrier to downstream fish migration. "Given this situation, it is not desirable to introduce hatchery fish derived from southern stocks as they may impact on the genetic make-up of the native "east-slope" stocks of the Pine River" (Ted Down, Ministry of Environment, Lands and Parks, Fort St. John, pers. comm.). To be consistent with the Provincial "Conservation" and "Wild Indigenous Fish" policies, a local "east slope" rainbow trout donor stock was sought.

Dunlevy Creek (Fig. 1) was initially identified as a local donor source of "east slope" wild stock rainbow trout *(Oncorhynchus mykiss)* for transplant to Simpson Lake. Dunlevy Creek is tributary to the Peace Reach of Williston Reservoir. Electrofishing was conducted in Dunlevy Creek in 1994 and revealed that juvenile rainbow trout densities were too low to permit removal of any fish from this system. As a result, another source of fish had to be identified.

A suitable donor source of rainbow trout, Williston Reservoir "east slope" wild stock, was then identified at the intake towers of the W.A.C. Bennett Dam. Fish from Williston Reservoir, which enter the penstock through the trashracks, may escape into the base of the intake towers (Fig. 2). Once in the intake tower, the fish tend to move upward in the water column toward the surface. The height of the intake tower is approximately 200 feet, depending on the reservoir level. Fish could remain at the surface for some time as the likelihood of a fish swimming back down the intake tower and into the penstock is remote. Hatchery stocked rainbow trout could be present in the intake towers, but would be readily identifiable by an adipose or pelvic fin clip. These hatchery fish were not to be used for the transplant.

When the donor source of rainbow trout at the W.A.C. Bennett Dam was approved, a transplant program was initiated in 1994. The intent of this transplant was to establish an "east-slope" rainbow trout population in Simpson Lake. A minimum of 25 spawning pairs of rainbow trout were required to establish a self perpetuating population (Rick Taylor, UBC, Vancouver, pers. comm.). Ted Down (MELP, Fort St. John, pers, comm.) suggested in order to build a viable population in Simpson Lake, a minimum of 60 fish were required, but 200 would be ideal. As a result, a minimum of 100 rainbow trout were deemed desirable to prevent a "genetic bottleneck" while attempting to establish a rainbow trout population in Simpson Lake.

Figure 1: Study Area

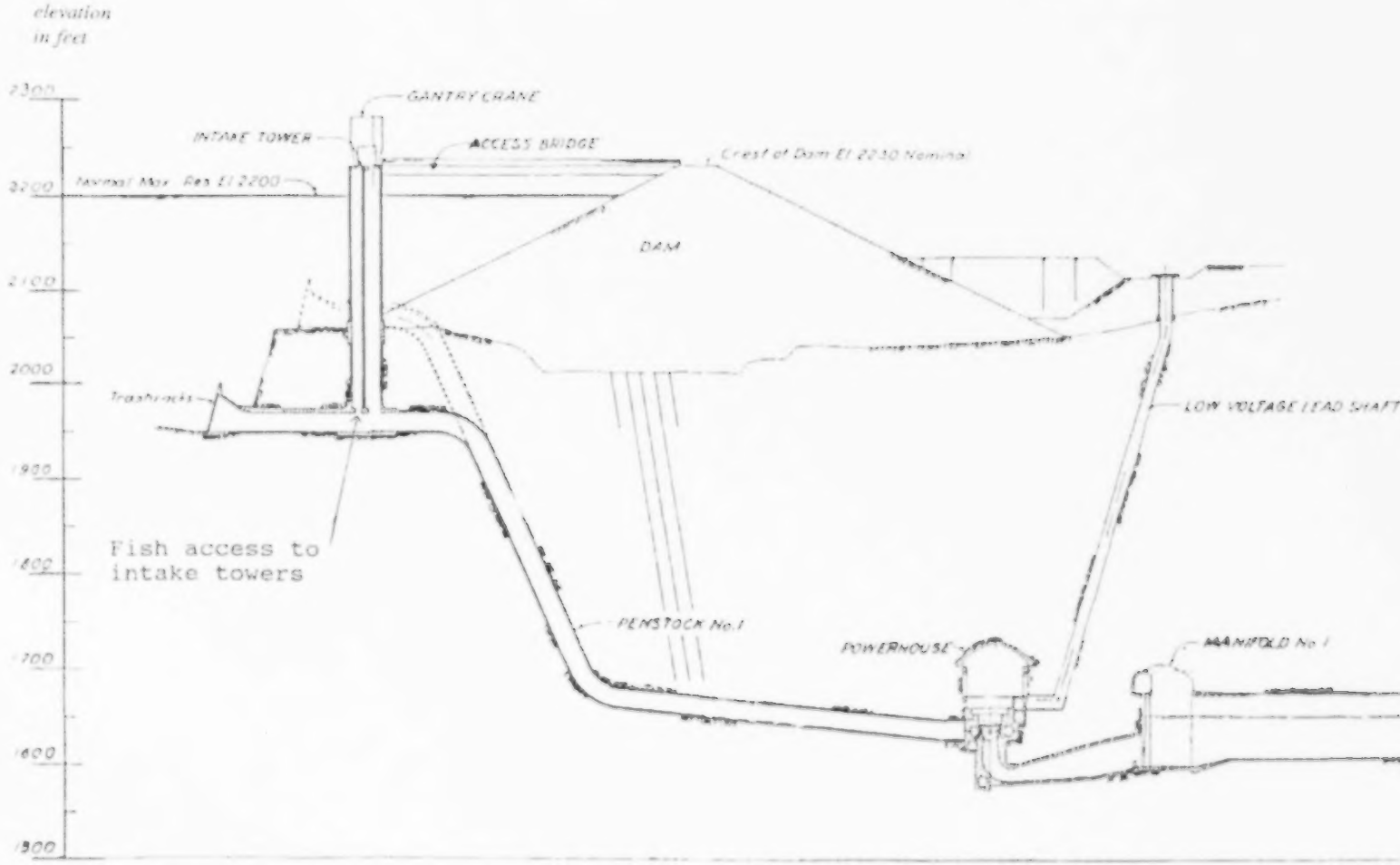

Figure 2: W.A.C. Bennett Dam

Study Area

Simpson Lake is located 65 km west of Chetwynd in management unit 7-31. A gravel logging road (two wheel drive access) passes within approximately 800 metres of the east shore of the lake (Fig. 3). No direct road access is available to the lake. An overgrown ATV trail, approximately one kilometre in length, accesses the lake near its outlet.

Lake Statistics: (McLean and Langston. 1991)

Latitude/Longitude:	55°32'04":122°40'15"	U.T.M.:	10.5208.61543
Management Unit:	7-31	N.T.S. Map No.:	93 - O/10
Mean Depth:	8.8 m.	Maximum Depth:	21.5 m.
Surface Area:	31.2 ha.	Elevation:	1204 m.
Drainage:	Unnamed Creek —> Pine River —> Peace River		

METHODS

Fish Capture

Two separate efforts in 1994 were attempted to capture rainbow trout from the intake towers at the W.A.C. Bennett Dam. The dam has a total of ten intake towers. The first attempt involved the use of angling techniques. Angling was performed with the use of spin cast rods and preserved salmon roe as bait. The roe was lowered about 20 m from the working platform to the water surface and then anywhere up to 3 m deep in the water column. Captured fish were raised to the working platform and placed in a cooler. The second attempt employed a small modified gillnet. The gillnet used was a sinking monofilament 51 mm "stretch measure" mesh size, 2.4 metres wide by 3.0 metres deep. The net had a rope attached to lower and raise it from the working platform to the water surface. Each capture attempt was set in the top (first 3 m) of the water column for approximately two minutes. The net was then raised to the platform and captured fish were placed in a cooler. Fish which could not be easily removed from the net were released by immediately breaking the gillnet line to prevent fish damage and undue stress.

Rainbow trout were sampled for length and weight. These fish were treated with a solution of one Alka Seltzer tablet dissolved in three litres of fresh water. The fork lengths were measured to an accuracy of 1 mm. Weights were measured on a hand-held digital spring balance accurate to ± 28 grams. Scale samples were taken for age determination. Fish larger than 225 mm were marked with Floy tags. All rainbow trout were visually inspected for adipose or fin clips (hatchery origin).

Only rainbow trout were transplanted to Simpson Lake. Other species captured were released into Williston Reservoir or Dunlevy Creek (Williston Reservoir tributary).

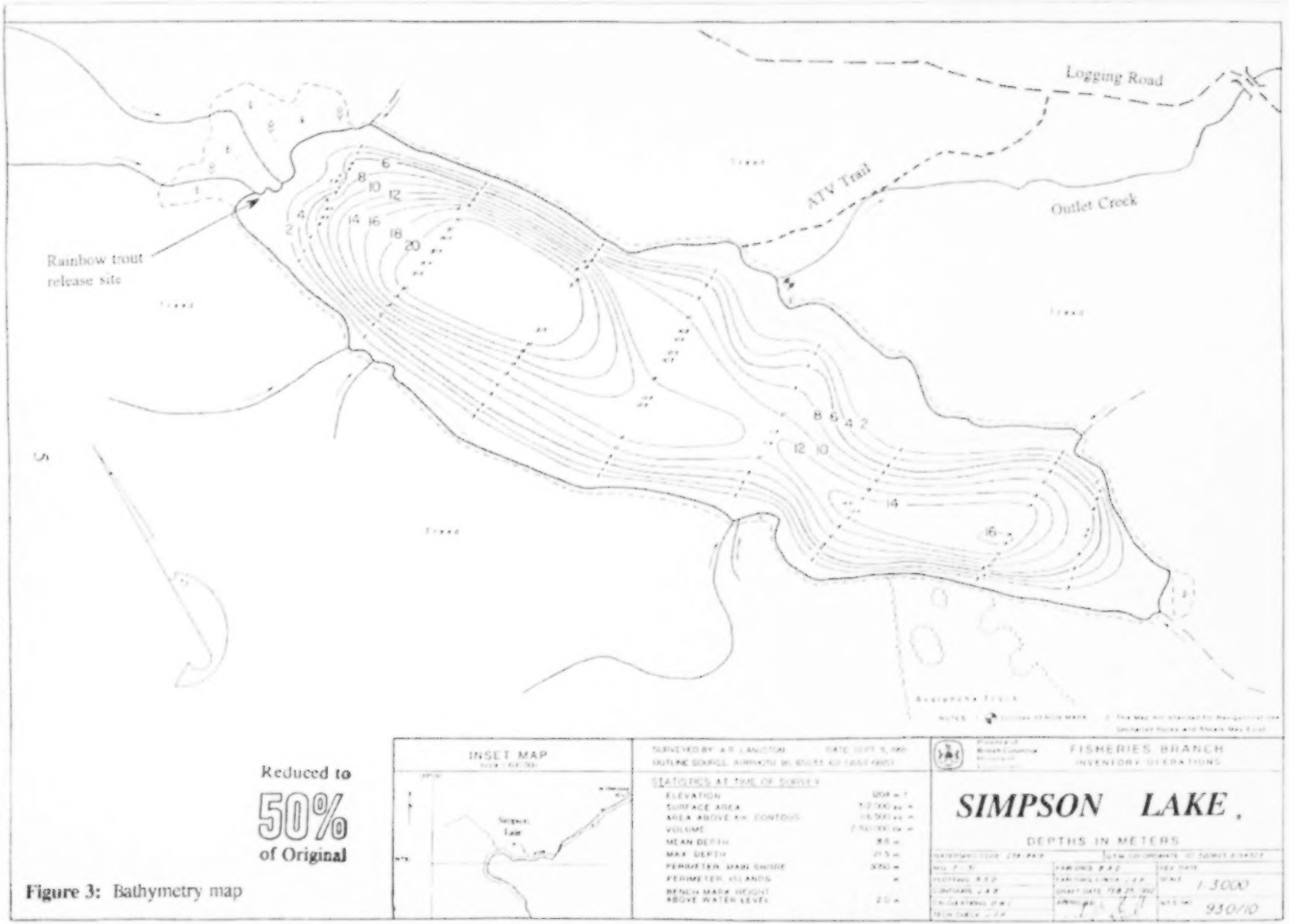

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Figure 3: Bathymetry map

RESULTS

Two separate attempts were made in 1994 to capture rainbow trout. The first attempt occurred on August 5. Not enough fish were captured on the first attempt, so a second attempt to capture more rainbow trout was undertaken. The second attempt was on October 19 and 20.

August 5, 1994

Twenty nine rainbow trout were captured; however, three died as a result of hooking injuries. Twenty of these fish received orange Floy Tags while the remaining six fish were too small to mark (Table 1). These twenty-six fish were then transplanted to Simpson Lake (Fig. 3) on October 21. These fish were transported to within 1 km of the lake by a truck in a 150 gallon transport tank equipped with oxygen. Since there was no road access to the lake, fish were then carried to the lake in a 20 gallon cooler.

Upon arrival at Simpson Lake, a canoe was used to transport the fish to a proper release site and away from the outlet. To ensure the rainbow trout were properly acclimated to the water temperature of the lake, the fish were released near the mouth of an inlet stream on the northwest side (Fig. 3). The stream temperature was colder than the lake surface temperature. The water temperature at the mouth of this creek was equivalent to the transport water temperature and was deemed adequate for fish release.

Other fish species were also captured by angling at the intake towers. Fifteen kokanee *(Oncorhynchus nerka)* and a small number of uncounted lake whitefish *(Coregonus clupeaformis)* were also captured. All kokanee and lake whitefish were released into Williston Reservoir, at the dam site, after fully recovering in a holding tank. No mortalities were observed.

October 19 and 20, 1994

Only three rainbow trout were captured by the gillnet effort during the two days in October. Gillnetting also captured 45 kokanee and one lake trout *(Salvelinus namaycush)*. The kokanee were in spawning condition and had an estimated fork length of 26 cm. The lake trout was an estimated 30 cm in length. In addition, gillnetting captured 172 lake whitefish.

No rainbow trout were transplanted into Simpson Lake during the capture effort in October as snow fall prohibited access to the lake. The three rainbow trout were then subsequently released into the Pine River at the Clearwater River Road bridge crossing (Fig. 1). The kokanee and lake trout were released into Dunlevy Creek at the only bridge crossing site. All lake whitefish were released into Williston Reservoir at the dam site. Approximately 18 lake whitefish may not have survived after release due to the stress involved in capturing and removal from the net.

Table 1. Fork length and weight measurements of transplanted rainbow trout in Simpson Lake.

Floy Tag Number (orange)	Fork Length (mm)	Weight (g)	Condition Factor (k)	Age (years)
2730	262	142	0.79	4+
2731	240	85	0.62	3+
2732	249	114	0.74	3+
2733	228	57	0.48	2+
2757	290	142	0.58	4+
2758	233	57	0.45	2+
2759	237	85	0.64	2+
2761	276	170	0.81	3+
2763	235	57	0.44	3+
2764	275	170	0.82	3+
2765	278	170	0.79	4+
2766	249	114	0.74	2+
2767	240	85	0.62	2+
2768	241	85	0.61	2+
2769	254	142	0.87	3+
2770	254	85	0.52	3+
2771	255	85	0.51	3+
2772	237	85	0.64	2+
2773	241	85	0.61	3+
2774	248	114	0.75	4+
No Tag	200	57	0.71	2+
No Tag	216	57	0.57	3+
No Tag	182	28	0.46	1+
No Tag	185	57	0.90	3+
No Tag	230	85	0.70	3+
No Tag	190	57	0.83	3+

Condition Factor Formula: k = (Weight (g) x 100) / Length (cm)

DISCUSSION

Attempting to capture live rainbow trout in the intake towers involved experimenting with two different techniques. The first attempt involved the use of angling gear. Angling techniques were successful for the first ten minutes in each tower. Hook avoidance and "spooking" of the fish eventually reduced catch per unit effort to zero. The second attempt implemented the use of a gillnet. The gillnet proved to be the more efficient means of capturing fish at this time as it caught rainbow trout and eliminated hook avoidance. In addition, other species not tempted by bait were still captured.

More rainbow trout were captured in August as compared to October. It is unknown if the lower numbers obtained in October were due to the time of year, or a result of the dam operations which periodically drain the intake towers for maintenance work on the turbines. Higher numbers of rainbow trout may be present in the intake towers in late May due to movements associated with spawning activity.

Only Rainbow trout (n=26) were transplanted into Simpson Lake. These trout averaged 239 mm in length, weighed 95 grams, and the mean condition factor was 0.66. The weight of these trout are quite small for their lengths when compared with data from fish of Dunlevy Creek and Carbon Creek (Williston Reservoir tributary). Although, the use of one size of mesh does bias towards a certain size fish. The only food available would appear to be the carcasses from dead fish. The low condition factors of these fish may indicate that they have been in the intake towers for some time.

The other species captured also benefited from this transplant project. Most of the kokanee captured were in spawning condition and immediately swam upstream when transplanted to Dunlevy Creek. The lake whitefish benefited from them being released back into Williston Reservoir. Future fish collecting from the intake towers should include consideration of all species captured.

The transplant of 26 rainbow trout was fewer than planned, and probably not enough to establish a viable population for Simpson Lake. A 1995 transplant is planned to further increase the population of rainbow trout in Simpson Lake. Other techniques of capturing fish in the intake towers that are less stressful to fish will be identified and used.

REFERENCES

McLean, A.R., and A.R. Langston. 1991. A reconnaissance survey of Simpson Lake. Peace/Williston Fish and Wildlife Compensation Program, Report No. 110 22pp plus appendices.